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Gemini, south and west of *Castor* and *Pollux* and moves about 3° eastward during the month. The motion gradually diminishes until October 29th, when the planet becomes stationary and then begins its retrograde or westward motion. At that date it is 7° west and the same amount south of *Pollux,* the southern and eastern of the two stars. As seen in the telescope the rings are not quite as wide open as they were during the early part of the year, the minor axis being about 40 per cent of the major.

Uranus is in fairly good position for evening observation. It is well above the horizon at sunset and passes the meridian shortly after 10 P. M. on September 1st and shortly after 6 P. M. on October 31st. It is in the constellation *Capricorn* and its motion is slowly westward until October 22d, when it becomes stationary and then resumes its eastward course. No bright star is near it, but a fourth magnitude star, *θ Capricorni,* is quite close during early September. The planet will pass about 8′, one-quarter of the Moon's apparent diameter, south of the star on September 4th. It then moves away to the west of the star, but after the planet resumes its eastward motion it will pass the star again on December 27th.

Neptune remains in the constellation *Cancer,* too faint for naked-eye view.

PLANETARY PHENOMENA FOR NOVEMBER AND DECEMBER, 1915.

By Malcolm McNeill.

PHASES OF THE MOON, PACIFIC TIME.

New Moon...	Nov.	6,	11^h	52^m	P.M.	New Moon...	Dec.	6,	10^h	4^m	P.M.
First Quarter	"	13,	3	3	P.M.	First Quarter	"	13,	3	38	A.M.
Full Moon...	"	21,	9	36	A.M.	Full Moon...	"	21,	4	52	A.M.
Last Quarter.	"	29,	2	15	P.M.	Last Quarter.	"	29,	4	59	A.M.

The Sun reaches its most southerly point and winter begins December 22d about 3 P. M., Pacific Time.

Mercury is a morning star, having passed inferior conjunction on October 22d, and will remain a morning star until it comes to superior conjunction on December 15th. At first its motion away from the Sun is quite rapid, so that by November 1st it rises nearly an hour and a half before sunrise. For a few days before this date it may be seen in the early morning twilight. It reaches greatest west elongation on November 7th. Its apparent distance from the Sun is then 18° 57′, rather a small distance for a greatest elongation, but the planet passed its aphelion only a week before, on October 30th. The interval of an hour and a half between the rising of the planet and sunrise continues until about the middle of the month, and does not become as small as an hour until near the close of the month. After passing superior conjunction it becomes an evening star, but does not reach a great enuf distance for naked-eye observations until after the end of December.

Venus is an evening star, having passed superior conjunction with the Sun on September 12th. But as it has moved away from the Sun rather slowly and is some distance south of the Sun until well into December, it has not been long above the horizon after sunset. On November 1st the interval is less than forty minutes and does not become as much as an hour until after the middle of the month. After December 1st the interval increases much more rapidly, so that it is about two hours on December 31st. It is in aphelion on December 9th, but this makes little difference in the relative positions of planet and Sun on account of the almost perfect circularity of the orbit of *Venus*.

Mars is gradually approaching opposition, but will not reach it until February 9, 1916. On November 1st it rises shortly after 11 P. M. and on December 31st shortly before 9 P. M. It moves 17° eastward and 4° southward from the extreme eastward part of *Cancer* into *Leo,* with a gradually diminishing motion until, on the last day of December, it changes its position by about one minute of arc, an amount far too small for naked-eye observation, and is nearly ready to begin its retrograde or westward motion. Thruout December it will not be far from the first magnitude star *Regulus, α Leonis*. On December 13th the planet and star are in conjunction, the former being about 2° 30′ north of the latter, and also about the same distance south of the fourth magnitude star *α Leonis,* the star which marks the junction of the handle and blade of the sickle, while *Regulus* marks the end of the handle. After this conjunction *Mars* moves about 2° to the east by the end of the month. Soon after the beginning of the year 1916 the planet will begin its retrograde motion and there will be another conjunction with *Regulus.* The motion of the planet with respect to the star thruout December and January will give a beginner in astronomy an unusually good opportunity for study of the direct and retrograde motion of a planet. *Mars* is still nearing the Earth quite rapidly, the distance diminishing from 123 to 77 millions of miles during the two months. On December 8th its distance from us is equal to the Earth's mean distance from the Sun. Its brightness also will increase by about one-third. At the end of the year it will be more than six times as bright as it was at the beginning, and it will not gain very much more before its maximum, near the time of opposition.

Jupiter is in fine position for evening observation. On November 1st it is on the meridian shortly before 9 P. M. and at the end of December shortly after sunset. It is in the constellation *Pisces* and up to the middle of the month moves westward slowly and with diminishing rapidity, the whole motion being less than 20′. It finishes this "arc of retrogression" on November 14th, and is then in nearly exactly the same place among the stars as it was on April 26th, the distance traveled during the backward motion being about 6° and the time occupied a little less than four months. After passing the stationary point the planet will move a little more than 3° eastward.

Saturn is getting into good position for evening observation as it approaches opposition. It rises shortly after 9 P. M. on November 1st, and at about 5 P. M. on December 31st. It retrogrades, moves westward, nearly 6°, during the two months in the constellation *Gemini,* south and west of *Castor* and *Pollux.*

Uranus is in the southwestern sky in the evening. It moves about 2° eastward in the constellation *Capricorn.* On December 7th it is again in conjunction with the fourth magnitude star *θ Capricorni,* passing about 6° to the south of the star. By the end of December it sets at about 7:30, but on account of its faintness it cannot be seen except when it it a considerable distance above the horizon.

Neptune is still in the constellation Cancer, too faint for naked-eye observation.